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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/611,525
Filing Date: July 01, 2003
Appellant(s): TRAMM ET AL.

Fred C. Tramm et al.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/11/2007 appealing from the Office action mailed 5/17/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,541,607	Reinhardt	12-1994
6,281,838	Hong	4-1999

3,768,050	Stiles	5-1971
7,030,824	Taft	5-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-8, 10-15, and 18-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reinhardt (US 5,541,607) in view of Hong (US 6,281,838).

a) Regarding to claims 1, 13, 18, 22, 24, 25 and 30, Reinhardt disclose a signal processing system, comprising:

a component that receives an antenna pointing signal (Fig. 2; Col 3, L5-10) and conveys signals associated with antenna auto-tracking (beamforming facilitate auto-tracking of antenna); and a monolithic shift key modulation component (ASIC Col 2, L65-57; Col 6, L25-60).

Reinhardt discloses all the subject matters above except for the specific teaching of a positive-intrinsic negative (PIN) diode phase shifter.

However, Hong in the same field of endeavor, disclose a select line phase shifter using base-3 delayed line, wherein PIN diode switches are used through a plurality of phase shift paths to introduce a plurality of phase shifts to the signal based on one of number or combination of the plurality of phase shifting paths (Fig. 3; Col 2, L66-Col 3, L1; Col 4, L29-67). The loss and distortion experienced by the transmission signal is significantly reduced (Col 2, L52-54). Therefore, it is obvious to one of ordinary skill in art to combine the teaching of PIN diode switched delay line of Hong with the transmitter modulation system of Reinhardt. By doing so, reduce signal interference and improve signal transmission quality in a communication system.

b) Regarding to claim 2, Reinhardt discloses the SK modulation component employing one or more binary phase shifters (Col 6, L25-60).

c) Regarding to claim 3, Hong disclose the respective phase shifter comprising multiply phase shifting paths in series to introduce a plurality of phase shifts based on the number of paths (Fig. 3).

d) Regarding to claims 4 and 12, Reinhardt disclose the binary phase shifters employed as a quadra-phase (QPSK) modulator to generate four phase shifts for the signal (Col 6, L25-60).

e) Regarding to claim 5, Hong disclose paths constructed in accordance with an equivalent electrical length that corresponds to a desired phase shift (abstract).

f) Regarding to claim 6, Hong disclose one or more reflective phase shifters (Col 1, L49-51; It implies that reflective phase shifters can be used instead of many other types of phase shifters).

g) Regarding to claim 7, Hong disclose reflective phase shifters comprising two phase shifting sections (32a and 32b in Fig. 3), wherein respective phase shifting sections comprise a hybrid coupled (Col 6, L19-25) and two PIN diode switches (36a and 36b).

h) Regarding to claim 8, Reinhardt disclose respective reflective phase shifters configured to generate at least a 90-degree phase shift and a 180-degrees phase shift via changing termination impedance state via the PIN diodes, wherein the 90 and 180 degree phase shifts are employed in connection to modulate the signal through four phase states (Col 6, L25-60).

i) Regarding to claim 10, Hong disclose a switched filter phase shifter that can be tuned for a particular phase shift over a plurality of frequencies (Col 3, L5-9).

j) Regarding to claim 11, Hong disclose the switched filter phase shifter comprising two parallel phase shifting networks in series (Fig. 3). Reinhardt disclose wherein respective networks provide two phase states, and coupling the networks provides for four phase states (Col 6, L25-60).

k) Regarding to claims 14, 21, and 29, Reinhardt disclose employed in connection with a satellite, aircraft or spacecraft (beamforming system; Col 1, L5-25).

l) Regarding to claim 15, Hong disclose a DC bias component employed to affect the impedance state of the PIN diode (Col 6, L34-57).

m) Regarding to claims 19, 20, 26 and 28, Hong disclose the phase shifting component employing one of a binary phase shifter, a reflective phase shifter, a hybrid

phase shifter or a switched filter phase shifter (Col 1, L49-51). The phase shifting component comprising PIN diode switches (Fig. 3).

n) Regarding to claim 23, Reinhardt disclose a diagnostic component to verify and facilitate trouble shooting the phase shifting component (computer 40 in Fig. 3 and 48 in Fig. 4).

o) Regarding to claim 27, Reinhardt disclose one or more of filtering signal noise, amplifying the signal, low pass filtering the signal, high pass filtering the signal, band pass filtering the signal, encrypting the signal, decrypting the signal, encoding the signal, or decoding the signal (Col 4, L16-25).

3. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reinhardt (US 5,541,607) in view of Hong (US 6,281,838), further in view of Taft et al (US 7,030,824).

Regarding to claim 9, Reinhardt and Hong disclose all the subject matters above except for the specific teaching of a hybrid phase shifter.

However, Taft teaches a hybrid phase shifter that comprises a transmission phase shifter (binary phase shifter) and a reflection phase shifter serially connected (Fig. 3D-G). The hybrid phase shifter provides precise phase control (Col 10, L54-58). Therefore, it is obvious to one of ordinary skill in art to combine the teaching of hybrid phase shifter of Taft in the transmitter modulation system of Reinhardt. By doing so, provide desirable phase controlled signal in a transmission system.

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reinhardt (US 5,541,607) in view of Hong (US 6,281,838), further in view of Mano (US 6,778,586).

Regarding to claim 16, Reinhardt and Hong disclose all the subject matters above except for the specific teaching of a RF component. However, Mano disclose a transmitter comprises a QPSK modulator (42), an amplifier (68) and a bandpass filter (66) to maximize power transfer and pass signals within a desired frequency band. In addition, this feature is also well known in the art. Therefore, it is obvious to one of ordinary skill in the art to combine the teaching of RF component of Mano with the transmitter modulation system of Reinhardt. By doing so, provide desirable transmission signal in a communication system.

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reinhardt (US 5,541,607) in view of Hong (US 6,281,838), further in view of Stiles (US 3,768,050).

Regarding to claim 17, Reinhardt and Hong disclose all the subject matters above except for the specific teaching of a high Q RF short component. However, such feature is well known in the art, and Stiles teaches a microwave integrated circuit (Col 6, L15-20). It is implied that a high Q component would provide a higher quality of the circuit and improve overall performance. Therefore, it would have been obvious to one of ordinary skill in art to combine the teaching of high Q RF short component of Stiles with the transmitter modulation system of Reinhardt. By doing so, provide more unit protection in a communication system.

(10) Response to Argument

A. With respect to claims 1-8, 10-15 and 18-30

The applicants group claims 1-8, 10-15 and 18-30 together and limit the argument to independent claims 1, 18, 24 and 30. In particular, the applicants argue that the prior art cited in Office Action by Examiner failed to disclose or suggests utilizing monolithic microwave integrated circuit (MMIC) technology to create a monolithic shift sky (SK) modulation component.

Response – As applicants mentioned above, applicant's invention is related to quadra-phase shift key modulator based on microwave monolithic integrated circuit (MMIC) technology. However, terminology "MMIC" was never cited in independent claims 1, 18, 24 and 30. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., MMIC) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). At most, "monolithic shift key (SK) modulation component" was claimed. Term "monolithic" merely means electronics of or pertaining to an integrated circuit formed in a single chip according to Dictionary.com (see attachment). Also, "monolithic" is defined as formed from a single crystal, a silicon chip, a circuit in Merriam Webster's Collegiate Dictionary, tenth edition (see attachment). Thus, "monolithic shift key (SK) modulation component" is interpreted as shift key modulation component is packaged or formatted on integrated circuit (IC). Prior art Reinhardt (5,541,607) discloses a digital

beamforming system, wherein digital bi-phase shift keyed (BPSK) or quadra-phase shift keyed (QPSK) modulation is implemented. The digital Application Specific Integrated Circuits (ASICs) is used to implement digital beamforming (Col 2, L63-67). Therefore, Reinhardt teaches a phase shifted modulation component implemented in a single chip. The claimed limitation is met. In addition, term "ASIC" disclosed by Reinhardt and "MMIC" are shown in patents as *"ASIC or MMIC"*. This indicates that "ASIC" and "MMIC" can be used interchangeably in the art. For example, U.S. Patent No.: 7,065,153 by Bach et al. (see attachment) disclose a QPSK modulator, wherein signals pass through BPSK modulators, which maybe identically configured on an MMIC or ASIC chip to achieve the precision phase and amplitude balance of QPSK modulator (Col 7, L47-64). Although QPSK modulation based on MMIC technology is applicants' invention, it was never in the claimed subject matter. Therefore, the applicants' argument is deemed to be incorrect.

B. Applicants argue that MEMS and PINS are two different devices and MEMS switch do not use PIN switches.

Response – Prior art Reinhardt discloses a component that receives an antenna pointing signal and a monolithic shift key modulation component, but is silent about a positive-intrinsic negative (PIN) diode phase shifter. However, prior art Hong disclose a base-3 selection of transmission lines use conventional switches including PIN diode and FET transistor switches (Col 2, L66-Col 3, L1). Though Hong's invention is preferred to use MEMS technology, he explicitly admitted that his invention can be implemented using PIN diode switches. Hong is no less anticipatory even if one

technology is preferred over the other one. Therefore, the applicants' argument is deemed to be incorrect.

C. Applicants argue that no where in prior art Hong et al. disclose PIN diode switches reduce loss and distortion. Instead it suffers from insertion loss.

Response – Prior art Hong introduces PIN diode switches suffer from insertion loss in base-2 phase shifter as the background of the invention (Col 2, L23-32). To improve from conventional switched-line phase shifter, Hong discloses a base-3 rather than base-2 switched lines. Thus, the loss and distortion is significantly reduced. (Col 2,L52-54). Hong further discloses that the base-3 transmission lines can be implemented using PIN diode switches (Col 2, L66-Col 3, L1). It is obvious to one of ordinary skill in art to recognize that base-3 switched lines phase shifter with PIN diode switches to reduce loss and distortion. Therefore, the applicants' argument is deemed to be incorrect.

D. With respect to claims 9, 16 and 17

The applicants make the same argument as applied to claim 1. Therefore, the same response applied to the argument with respect to claim 1 above is also applied here.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Eva Yi Puente EP

Patent Examiner

Art Unit 2611

Conferees:

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